CLAIMS:

1. A method for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

removing the portion of the intervertebral disc from the spinal column; and

inserting an apparatus for replacing the portion of the intervertebral disc,

wherein the apparatus for replacing the portion of the intervertebral disc is operable to permit respective vertebral bones of the spinal column between which the apparatus is positioned to articulate in flexion and extension in an anterior-posterior plane of the spinal column, lateral bending in a lateral plane of the spinal column, and axial rotation through a range of angles without permitting the vertebral bones to substantially move in directions directed away from one another along a longitudinal axis of the spinal column.

2. The method of claim 1, wherein the apparatus for replacing the portion of the intervertebral disc is further operable to cause the vertebral bones to displace from one another at axial rotations outside the range of angles.

3. The method of claim 1, wherein:

the apparatus includes a first member having a first vertebral contact surface for engagement with an endplate of a first of the vertebral bones in the spinal column, and a first articulation surface;

the apparatus includes a second member having a second vertebral contact surface for engagement with an endplate of a second of the vertebral bones in the spinal column, and a second articulation surface; and

the first and second articulation surfaces are operable to engage one another to permit flexion and extension in the anterior-posterior plane of the spinal column, lateral bending in the lateral plane of the spinal column, and axial rotation.

4. The method of claim 3, wherein the first member includes an anterior flange including at least one through hole, and the method further comprises inserting at least one bone screw through the at least one through hole to fasten the first member to the first vertebral bone.

5. The method of claim 3, wherein the anterior flange of the first member includes at least two through holes, and the method further comprises inserting a bone screw through each of the through holes to fasten the first member to the first vertebral bone.

6. The method of claim 3, wherein the second member includes an anterior flange including at least one through hole, and the method further comprises inserting at least one bone screw through the at least one through hole to fasten the second member to the second vertebral bone.

7. The method of claim 3, wherein at least one of the first and second members further includes a curvate surface formed on its vertebral contact surface, and the method further comprises positioning the curvate surface to interface with a curvate portion of the endplate of the vertebral bone against which the vertebral contact surface is disposed.

8. The method of claim 3, wherein at least one of the first and second members further includes at least one spike formed on its vertebral contact surface, and the method further comprises urging the spike into the endplate of the vertebral bone against which the vertebral contact surface is disposed.

9. The method of claim 3, wherein the articulation surfaces are non-congruent in shape and maintain substantial point-to-point contact over a range of articulating movement between the vertebral bones.

10. The method of claim 3, wherein:

the first articulation surface is defined by a concave arc, generally of radius A about a first axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a convex arc, generally of radius B about a first axis substantially perpendicular to the lateral plane of the spinal column; and

the second articulation surface is defined by a convex arc, generally of radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a

concave arc, generally of radius D about a second axis substantially perpendicular to the lateral plane of the spinal column.

11. The method of claim 10, wherein at least one of: (i) the first and second axes perpendicular to the anterior-posterior plane of the spinal column are substantially coaxial; and (ii) the first and second axes perpendicular to the lateral plane of the spinal column are substantially coaxial.

12. The method of claim 10, wherein at least one of: (i) the first and second axes perpendicular to the anterior-posterior plane of the spinal column lie in a plane that is substantially perpendicular to the anterior-posterior plane; and (ii) the first and second axes perpendicular to the lateral plane of the spinal column lie in a plane that is substantially perpendicular to the lateral plane.

13. The method of claim 3, wherein the first and second articulation surfaces are saddle shaped such that they are operable to engage when the first and second members are disposed in the intervertebral disc space to articulate in at least one of flexion, extension, lateral bending, and axial rotation.

14. The method of claim 1, wherein the range of angles is about plus/minus three degrees from a resting position.

15. The method of claim 1, wherein the apparatus is operable to permit the vertebral bones to displace away from one another at axial rotations outside the range of angles.

16. A method for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

removing the portion of the intervertebral disc from the spinal column; and

inserting an apparatus for replacing the portion of the intervertebral disc, wherein:

the apparatus for replacing the portion of the intervertebral disc includes: (i) a first member having a first vertebral contact surface for engagement with an endplate of a first

vertebral bone in the spinal column, and having a first saddle shaped articulation surface, and (ii) a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone in the spinal column, and having a second saddle shaped articulation surface,

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to articulate in at least one of flexion, extension and lateral bending.

17. The method of claim 16, wherein:

the first articulation surface is defined by a concave arc, generally of radius A about a first axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a convex arc, generally of radius B about a first axis substantially perpendicular to the lateral plane of the spinal column; and

the second articulation surface is defined by a convex arc, generally of radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a concave arc, generally of radius D about a second axis substantially perpendicular to the lateral plane of the spinal column.

18. The method of claim 17, wherein the radius A of the concave arc is greater than the radius C of the convex arc in order to permit at least some axial rotation of the first and second vertebral bones through a range of angles without permitting the vertebral bones to substantially move in directions directed away from one another along a longitudinal axis of the spinal column.

19. The method of claim 17, wherein the radius D of the concave arc is greater than the radius B of the convex arc in order to permit at least some axial rotation of the first and second vertebral bones through a range of angles without permitting the vertebral bones to

substantially move in directions directed away from one another along a longitudinal axis of the spinal column.